

Analysis of Determinants of Financial Performance for Construction Industry in India



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This paper aims at ascertaining the determinants of financial performance for construction industry. We use the financial data of one hundred thirty-two construction industry companies which are listed in the Indian stock exchanges. The result of the data shows that logarithm of PBIT by total assets, working capital to total assets, total assets turnover ratio, current assets turnover ratio and current ratio as independent variables emerge as determinants of the financial performance of construction industry of the study. Further studies can be undertaken for company wise analysis in construction industry and infrastructure companies in India.

Keywords: Net Profit Ratio, Net Profit to Assets, Return on Investment, Return on Equity, Operating profit to Total Assets, Operating Profit to Total Assets, Construction Companies

1. Introduction

Governments of different countries all over the world take leading role in development of infrastructure. India has opted for different models for developing infrastructure in India. Over the years, Government has allowed FDI in different sectors of the economy, including infrastructure sectors. While it is a good move to attract private capital to develop infrastructure in the country, GOI should also understand the financial performance position and ascertaining the determinants of financial performance of the companies involved in the development of infrastructure. The study on financial performance of companies undertaken by Frederick et.al (1984) studied the risk-return characteristics of the portfolios and compared them with fundamental performance measures and found that rankings are correlated with variability of returns. Titman and Wessel (1988) found that transaction costs are the important determinants of capital structure. Hasnath and Chatterjee (1990) analysed the patterns of public sector construction expenditures in the United States for the years 1957-1985. Their analysis of expenditure trend showed that demand and supply factors influence capital expenditure. Buckmaster and Saniga (1990), Osteryoung and Richard 1992) report that earnings on total assets and equity are important to understand the financial performance of an enterprise. Cornett and Tehranian (1992) observed the benefits from merger and acquisition for a bank. This merger and acquisition seemed to bring about their expanded ability to pull in financial performance. Healy *ET. al.* (1992) explored the post-acquisition

performance of the companies which are resident in the US. The study evaluated cash flow performance of the merger-initiated companies. Results demonstrated that the merged organizations enlisted improvements in the post-merger working execution in contrast with that of their industry peers. These increases emerged from enhancements in resource efficiency. Pilloff and Santomero (1998) analysed value of the banks with respect to merger and acquisition. Result shows that there is an increase in the performance because of the merger and acquisition. Karthikeyan (2000) found positive relationship between the financial performance and financial forecasting. Beena (2000) observed that merger and acquisition movement was dominant in the 1990s. Merger and acquisition has contributed lot to the companies' financial performance. Yeh and Hoshino (2000) studied how mergers and acquisitions impact stock prices and financial performance of acquiring firms and reports that these have positive impact. Pawaskar (2001) observed the operating performance of the companies and found that asset turnover and profit margins have major impact on companies' performance. Manoharan (2002) studied the performance of cement companies in India using age, size, and location. The study found that leverage and earnings are related. Lermack (2003) argues that financial ratio analysis is of immense use in assessing the performance of companies. Gugler *ET. al.* (2003) report that although merger and acquisition (an independent variable considered in their study) result in increased profits, they reduce the sales of the merged entity. Sudarshan (2003) analysed the receivables of Andhra Pradesh Paper Industry and they suggested the preparation of frequent debtors aging schedule will lead to improvement in the performance of companies. Ali et al (2004) studied BOT model in Turkey and found that there were problems related to coordination, land acquisition and use, water, operation time period, financing mix of the project, return on equity. Bardia (2004) applied Spearman's rank correlation between liquidity and financial performance and found a positive association between the two. Narware and Sharma (2004) used ratios, correlations analysis and multiple regression analysis to study the relationship between working capital and financial performance and the study reports that working capital and financial performance have both negative and positive association. Chen and Messner (2005) analysed BOT in water projects in China and found that many factors influence the capital structure and performance of these water projects. Thomas (2006) studied the risk probability and assessment framework and demonstrated in the context of critical risks in Indian BOT road projects. Dale et.al (2008) analysed infrastructure companies in the US and found that there are difficulties in understanding productivity growth because of the data revisions. Karadeniz *et.al* (2009) investigated the factors influencing capital structure decisions of the Istanbul Stock Exchange firms and found that a number of variables influence capital structure choice. Edward and Elizabeth (2009) observed corporate social responsibility and financial performance are positively related. Gurbuz *et.al* (2010) observed the corporate governance and financial performance are positively related in Turkey. Gnanavelu (1996) found that to increase financial performance there is a need for good financial performance and minimum borrowing. Cinca *ET .al.* (2005) argue that size of a firm and the location of the firm impact the financial ratio structure. Blessing and Onoja (2015) found that combined leverage and operating leverage have impact on financial performance. Saurabh and Sharma (2016) report that capital structure or financial leverage does not impact firm's

financial performance. Rakesh (2018) studied the determinants of capital structure and reported that financial performance, size, age, debt service capacity growth and tax shield variables are the significant firm-level determinants of capital structure. Manjunatha and Gujjar (2018a; 2018b) analyzed and found that net income of the organization is not enough to determine its efficiency unless profit margin, asset turnover, financial leverage is taken into consideration. In most of the developing countries there has been a debate on the level of efficiency of the state, public sector, and listed companies. Kavitha and Mohanraj (2019) found that capital structure is negatively related with liquidity while it is positively related with cost of debt, size of the business, liquidity, financial performance and collateral value of asset. Manjunatha et.al (2020) found that return on equity is better in creating positive shareholders value and found that return on sales, return on assets and assets turnover are positively correlated with ROE. Praveen and Manjunatha (2021) calculated return on equity for software and training services companies in India using three factors DuPont model and five factors DuPont model and found that there is a significant relationship between ROE, asset turnover and profit margin. Manjunatha et.al (2020) found that ROE is better in creating positive shareholders value and found that ROS, ROA and ATO are positively correlated with ROE. Manjunatha and Vikas (2021) found that there is a significant difference in the financing pattern and independent variables have inverse relationship with the financing pattern of selected infrastructure sectors in India.

While many studies have been conducted on determinants of financial performance of companies in the western countries, there are a few studies in the Indian context. Authors' sample data used for their studies is also limited to one sector/few sectors. Studies by Karthikeyan (2000) and Rakesh (2018) have generally supported the determinants of financial performance in India. There is no robust conclusive evidence that whether we can use particular variables to know the determinants of financial performance in India and further Kavitha and Mohanraj (2019) suggested to use large sample for longer span of time to ascertain the relationship between financial performance of firms and liquidity, leverage, financial performance and efficiency ratios. Therefore, this study is undertaken on construction industry. Further, the study also uses the ratios and regression analysis for getting the overall results for the construction industry in India. The paper is organized in four parts. Part 1 is the introduction; Part 2 presents objectives and methodology; Part 3 analyses the results; Part 4 presents the summary and conclusions. References and Tables are given after Part 4.

2. Objectives and Methodology

2.1 Objective

We have set following objective based on the evidence of review of literature

- to test the determinants of financial performance for construction industry in India

2.2 Data and Sample

We use the financial data of one hundred thirty-two companies in construction industry which are listed in the Indian stock exchanges. The required secondary data of annual reports are collected from the capital market line database and prowest

database. This study uses the annual reports and the various corporate news releases of the companies to assess the determinants of the financial performance of construction industry. The companies are selected based on two criteria: a) the companies selected should have been listed and traded in Indian stock exchanges and b) annual reports and financial statements should be available for the years 1999-2000 to 2017-2018. The total number of companies included in this study, using the above criteria is one hundred thirty-two. The financial performance measures of eight dependent variables viz. a) Net Profit Ratio(NPR); b) Net Profit to Total Assets (NPTA); c) Return on Investment (Total) ratio (ROI); d) Return on shareholders' Equity (ROE); e) Return on Total Asset (ROTAs; f) Return on Fixed Assets(ROFA); g) Retained Earnings to Total Assets (RETA) and h) Operating Profit to Total Assets(OPTA) and 41 independent variables viz. 1) current ratio; 2) liquid ratio; 3) inventory to working capital; 4) current liabilities to net worth; 5) current liabilities to total assets; 6) working capital to net sales; 7) working capital to operating expenditure; 8) cash flow to current liabilities; 9) inventory turnover ratio; 10) receivables turnover ratio; 11) creditors turnover ratio; 12) total assets turnover ratio; 13) fixed assets turnover ratio; 14) working capital turnover ratio; 15) current assets turnover ratio; 16) long term debt to equity (net worth ratio); 17) total debt-equity ratio; 18) total debt (exclusive current liabilities) to debt + equity; 19) total debt (exclusive current liabilities) to total assets ratio; 20) capital gearing ratio; 21) proprietary ratio (fixed assets/shareholders equity); 22) leverage ratio; 23) long term debt to total capitalization (book value); 24) long term debt to total asset; 25) short term debt to total debt(including current liabilities); 26) EPS ; 27) pay-out ratio; 28) price to earnings ratio; 29) book value per share; 30) price to book value ratio; 31) net fixed assets to total Assets; 32) working capital to total assets; 33) retained earnings to total assets; 34) market value of equity to book value of debt; 35) market equity or market capitalization; 36) market value of firm; 37) logarithm of sales; 38) logarithm of total assets; 39) dividend to paid up capital; 40) PBIT to total assets and 41) cash profits to sales are computed from financial statements of sample infrastructure companies from the years 2000 to 2018 and are aggregated for the construction industry.

2.3 Tools of Analysis

There are numerous factors both qualitative and quantitative, including the subjective judgment of financial managers which conjointly determine the financial performance of a firm. The main determinants of the financial performance are many. In this study we use forty-one different financial ratios to ascertain how these ratios influence the financial performance of the construction industry. We use financial statement analysis tools and regression model for the paper. Eight ratios representing financial performance are dependent variables and forty-one ratios are taken as independent variables for construction industry. The following regression equations are designed to test the relationship and significance.

$$\text{NPR} = \alpha_i + \beta_{1*} \text{variable}_i + e_i \quad \dots 1$$

$$\text{NPTA} = \alpha_i + \beta_{1*} \text{variable}_i + e_i \quad \dots 2$$

ROI = $\alpha_i + \beta_1 * variable_i + e_i$...3

ROE = $\alpha_i + \beta_1 * variable_i + e_i$...4

ROTA = $\alpha_i + \beta_1 * variable_i + e_i$...5

ROFA = $\alpha_i + \beta_1 * variable_i + e_i$...6

RETA = $\alpha_i + \beta_1 * variable_i + e_i$...7

OPTA = $\alpha_i + \beta_1 * variable_i + e_i$...8

We use regression analysis by taking one independent variable and one dependent variable at a time and present results of the regression co-efficients and their corresponding probability values (p-values) for construction industry which results in 328 regression lines (41x8) in Tables 1A & 1B.

3. Results and Analysis

The findings of the determinants of financial performance for construction industry are presented in the following paragraphs.

The regression result reported in the Table 1A shows the determinants of NPR. Of forty-one independent variables analyzed, thirty-three exhibit positive association with NPR and eight exhibit negative associations. A positive association indicates that the independent variable has a direct relationship with NPR which means as the independent variable increases, NPR also increases. Of the forty-one independent variables analyzed, ten exhibit a statistically significant association with NPR and thirty-one exhibit statistically insignificant associations. Out of the ten independent variables having statistically significant association with NPR, eight exhibit positive associations with NPR and two exhibit negative associations. The coefficients of the eight independent variables viz. current ratio, working capital to net sales, working capital to operating expenditure, total assets turnover ratio, working capital to total assets, retained earnings to total assets, logarithm of sales and logarithm of PBIT by total assets have positive and statistically significant relationship with the net profit ratio and therefore, we conclude that these variables are the determinants of the NPR in the construction industry.

Table 1A Determinants of Financial Performance for Construction Industry (N=132)

DV	a		b		c		d	
IV	i	ii	i	ii	i	ii	i	ii
1	10.58	0.00*	0.02	0.00*	3.01	0.32	6.46	0.16
2	7.04	0.06	0.02	0.00*	3.67	0.27	5.02	0.32
3	0.32	0.49	0	0.55	0.16	0.7	0.44	0.48
4	0.58	0.47	0	0.02*	-0.23	0.75	-5.4	0.00*
5	-35.9	0.03*	-0.02	0.36	17.37	0.24	2.42	0.91
6	1.02	0.00*	0	0.37	0.06	0.5	-0.01	0.93
7	2.58	0.00*	0	0.33	0.18	0.48	0.02	0.96
8	-0.08	0.99	-0.01	0.16	-8.52	0.19	-0.2	0.98

9	0	0.55	0	0.83	0	0.58	0	0.63
10	0	0.83	0	0.4	0	0.85	0	0.63
11	0.58	0.67	0	0.01*	0.43	0.76	1.21	0.56
12	13.46	0.05*	0.05	0.00*	18.4	0.00*	18.11	0.05
13	0	0.9	0	0.89	0	0.99	0.01	0.63
14	0.08	0.58	0	0.02*	0.06	0.6	0.23	0.22
15	2.34	0.47	0.02	0.00*	4.75	0.02*	8.72	0.17
16	-0.63	0.56	0	0.014*	-0.5	0.61	-7.82	0.00*
17	0.4	0.59	0	0.01*	-0.53	0.43	-5.04	0.00*
18	0.01	0.97	0	0.89	0.02	0.89	-0.01	0.97
19	14.36	0.19	-0.02	0.09	-15.55	0.12	-41.41	0.00*
20	-1.82	0.22	0	0.023*	-11.09	0.00*	-6.16	0.01*
21	-0.47	0.71	0	0.11	-3.71	0.00*	-4.77	0.00*
22	1.99	0.85	-0.04	0.00*	-4.37	0.64	-19.07	0.17
23	1.51	0.5	0	0.71	0.65	0.77	0.72	0.83
24	0.13	0.99	-0.06	0.01*	-11.57	0.51	-68.96	0.01*
25	0.37	0.94	-0.01	0.06	-2	0.67	-15.38	0.02*
26	0	0.15	0	0.00*	0	0.1	0.01	0.00*
27	2203	0.91	-1.56	0.94	-3438	0.61	5111	0.83
28	0	0.17	0	0.35	0	0.08	0	0.54
29	0.15	0.913	0	0.94	-0.23	0.61	0.34	0.83
30	0	0.72	0	0.71	0	0.46	0	0.55
31	13.19	0.527	-0.02	0.45	-25.33	0.17	-8.65	0.75
32	63.3	0.00*	0.08	0.00*	6.99	0.52	20.44	0.2
33	64.97	0.00*	0.11	0.00*	30.28	0.04*	42.05	0.05
34	0	0.61	0	0.11	0	0.72	0	0.59
35	0	0.78	0	0.74	0	0.54	0	0.82
36	0	0.78	0	0.74	0	0.54	0	0.82
37	7.34	0.00*	0	0.34	1.77	0.22	-1.38	0.53
38	2.51	0.19	0	0.046*	-1.38	0.43	-4.29	0.09
39	22.32	0.26	0.06	0.53	14.28	0.42	4.85	0.86
40	8.319	0.001*	0.03	0.00*	14.73	0.00*	7.3	0.05*
41	-5.04	0.02*	0	0.65	-2.06	0.3	2.72	0.36
42	33	31	21	24	23	35	23	31
43	8	10	20	17	18	6	18	10
44		25		11		19		21
45		6		13		16		10
46		8		10		4		2
47		2		7		2		8

Source: Computed by the Researcher using the Ratios and Fitting the Simple Linear Regression

- Note 1:** First row of the Table 1 A serial number a to d represents dependent variables which are explained under the heading ‘data and sample’.
- Note 2:** First column of the Table 1A serial number 1 to 41 represents independent variables
- Note 3:** Second and third column of the Table1A serial number i and ii indicates coefficient and p values respectively. Same explanation holds good for column fourth to ninth.

Note 4: Forty second row of the Table indicates the number of positive coefficients (N+ve/ $P > 0.05$).

Note 5: Forty third row of the Table indicates the number of negative coefficients (N -ve/ $P < 0.05$).

Note 6: Forty fourth row of the Table indicates the number of positive coefficients and their statistical significance (N +ve, $P > 0.05$).

Note 7: Forty fifth row of the Table indicates the number of negative coefficients and not statistically significant (N -ve, $P > 0.05$).

Note 8: Forty sixth row of the Table indicates the number of independent variables having statistically significant association with dependent variable (N +ve, $P > 0.05$).

Note 9: Forty seventh row of the Table indicates the number of independent variables which do not have statistically significant association with dependent variable (N -ve, $P > 0.05$).

Note 10: The*mark in the p-value column denotes that the corresponding coefficients of the independent variables are statistically significant at 5% level of significance. N at the top of the table represents the number of observations taken for fitting the regression. For example, the number of companies taken for analysis in construction industry is 132 and therefore, this is the value of N.

Note 11: The source and notes hold good for the Table 1B also.

Note: The above analysis is based on forty-one independent variables which are used as determinants of financial performance of the companies in construction industry. Since this is the first dependent variable taken for analysis, we have used all the forty-one variables and interpreted the results. We use only the coefficients of the independent variables which have positive and statistically significant relationship with the seven dependent variables that are taken for further analysis. The interpretation of all the independent variables is identical for the remaining seven dependent variables. Therefore, only the overall interpretation is given to save the space, ensure brevity and avoid monotony.

Further, Table 1A shows that the ten independent variables viz. current ratio, liquid ratio, creditors turnover ratio, total assets turnover ratio, working capital turnover ratio, current assets turnover ratio, EPS, working capital to total assets, retained earnings to total assets and logarithm of PBIT by total assets are the determinants of the NPTA. The four independent variables viz. total assets turnover ratio, current assets turnover ratio, retained earnings to total assets and logarithm of PBIT by total assets are the determinants of the ROI. The two independent variables viz. EPS and logarithm of PBIT by total assets are the determinants of ROE. Table 1B show that, the three independent variables viz. working capital to operating expenditure, fixed assets turnover ratio and working capital to total assets are the determinants ROFA. The seven independent variables viz. current ratio, liquid ratio, creditors' turnover ratio, total assets turnover ratio, EPS, working capital to total assets and logarithm of PBIT by total assets are the determinants of the RETA. The five independent variables viz. total assets turnover ratio, working capital turnover ratio, current assets turnover ratio, net fixed assets to total assets and logarithm of PBIT by total assets are the determinants of the OPTA.

Table 1B Determinants of Financial Performance for Construction Industry (N=132)

DV	e		f		g		h	
IV	i	ii	i	ii	i	ii	i	ii
1	1.23	0.00*	96.03	0.13	0.09	0.00*	-0.03	0.15
2	1.78	0.00*	29.84	0.67	0.10	0.00*	-0.02	0.42
3	0.00	0.97	0.70	0.94	0.00	0.10	0.00	0.24
4	-0.19	0.08	12.01	0.43	-0.01	0.11	0.00	0.93
5	-0.98	0.66	-415.80	0.18	-0.41	0.00*	0.09	0.42
6	0.03	0.04*	3.27	0.11	0.00	0.06	0.00	0.96
7	0.07	0.07	10.48	0.05*	0.00	0.06	0.00	0.83
8	-0.26	0.79	46.27	0.74	0.04	0.32	0.03	0.59
9	0.00	0.63	0.00	0.93	0.00	0.96	0.00	0.83
10	0.00	0.51	0.00	0.92	0.00	0.58	0.00	0.57
11	0.41	0.04*	5.71	0.83	0.02	0.02*	0.01	0.26
12	6.77	0.00*	7.17	0.96	0.11	0.00*	0.13	0.00*
13	0.00	0.28	3.44	0.00*	0.00	0.41	0.00	0.06
14	0.04	0.02*	-0.52	0.84	0.00	0.26	0.00	0.00*
15	3.49	0.00*	-10.67	0.91	0.05	0.07	0.10	0.00*
16	-0.23	0.11	-9.65	0.64	-0.01	0.04*	0.00	0.93
17	-0.19	0.05*	7.66	0.58	-0.01	0.05	0.00	0.95
18	-0.01	0.69	0.65	0.85	0.00	0.96	0.00	0.56
19	-1.08	0.47	77.94	0.71	0.03	0.59	0.06	0.46
20	-0.42	0.06	-23.23	0.44	-0.01	0.18	0.00	0.99
21	-0.08	0.64	-18.34	0.45	-0.01	0.05*	0.01	0.42
22	-1.55	0.27	-74.17	0.71	-0.15	0.0084*	0.11	0.13
23	-0.07	0.83	-13.49	0.76	0.00	0.87	0.00	0.83
24	-3.53	0.18	-161.61	0.66	-0.22	0.03*	0.11	0.38
25	-0.52	0.45	-21.43	0.83	-0.05	0.11	0.05	0.18
26	0.00	0.01*	0.02	0.07	0.00	0.01*	0.00	0.31
27	-617.8	0.75	-146.00	0.84	47.19	0.57	-147.	0.12
28	0.00	0.71	0.00	0.28	0.00	0.43	0.00	0.31
29	-0.04	0.75	-0.97	0.84	0.00	0.57	-0.01	0.12
30	0.00	0.91	0.00	0.97	0.00	0.29	0.00	0.91
31	4.15	0.13	-727.36	0.06	-0.11	0.32	0.37	0.011*
32	5.40	0.06*	667.11	0.00*	0.35	0.00*	-0.10	0.20
33	8.85	0.00*	191.25	0.53	0.00	0.68	0.02	0.86
34	0.00	0.09	0.00	0.90	0.00	0.55	0.00	0.61

35	0.00	0.39	0.00	0.82	0.00	0.55	0.00	0.94
36	0.00	0.39	0.00	0.82	0.00	1.00	0.00	0.94
37	0.77	0.00*	24.03	0.43	-0.02	0.03*	0.02	0.06
38	-0.12	0.65	-37.24	0.31	0.13	0.22	0.01	0.46
39	2.99	0.27	-195.17	0.60	0.06	0.00*	-0.05	0.69
40	4.20	0.00*	19.96	0.77	-0.02	0.21	0.08	0.00*
41	-0.15	0.62	28.36	0.50	9.06	0.15	-0.01	0.66
42	17	28	21	38	21	27	27	36
43	24	13	20	3	19	13	14	5
44		5		18		14		22
45		23		20		13		14
46		12		3		7		5
47		1		0		6		0

Note 1: First row of the Table 1B serial number e to h represents dependent variables which are explained under the heading 'data and sample'

4. Summary and Conclusion

This paper has attempted to test the determinants of financial performance for construction industry in India. The summary and conclusions of these results are presented in this section. We found that (A) logarithm of PBIT by total assets as an independent variable is a determinant for six dependent variables viz. NPR, NTPA, ROI, ROE, RETA and OPTA. (B) Total assets turnover ratio as an independent variable is a determinant for six dependent variables viz. NPR, NTPA, ROI, ROFA, RETA and OPTA. (C) Working capital to total assets as an independent variable is a determinant for four dependent variables viz. NPR, NTPA, ROFA and RETA. (D) Current ratio as an independent variable is a determinant for three dependent variables viz. NPR, NTPA and RETA and (E) Current assets turnover ratio as an independent variable is a determinant for three dependent variables viz. NTPA, ROI and OPTA. We conclude that, of the forty-one independent variables analysed, five independent variables viz. logarithm of PBIT by total assets, total assets turnover ratio, working capital to total assets, current ratio and current assets turnover ratio emerge as major determinants of the financial performance of construction industry. Further, we found that thirteen independent variables viz. inventory to working capital; cash flow to current liabilities; inventory turnover ratio; receivables turnover ratio; total debt (exclusive of current liabilities) to debt + equity; long term debt to total capitalization (book value); pay-out ratio; price to earnings ratio; book value per share; price to book value ratio; market value of equity to book value of debt; market equity or market capitalization and market value of firm are not the determinants of financial performance for construction industry of the study. The results of the study may be used by researchers to compare with other foreign infrastructure companies to understand the determinants of financial performance of the infrastructure industries. We have analysed only the listed companies and further studies can include unlisted companies. Further studies can be undertaken for company wise

analysis and also bivariate, trivariate and multivariate regressions models may be designed for better understanding of the relationship and significance in construction industry in India and western countries.

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